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Electrical lamp and lamp base

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## Electrical lamp and lamp base

The invention relates to the basing of electrical lamps.

In addition, the invention relates to a lamp base for use in an electrical lamp.

Electrical lamps generally comprise a lamp vessel closed in a gastight manner, the lamp vessel being provided with an illumination source. The illumination source can be, 5 for example, a (tungsten) incandescent body provided in the lamp vessel or a halogen lamp vessel or a halogen burner provided in the lamp vessel. In addition, the illumination source can be a metal halide lamp provided in the glass vessel.

10 Electrical lamps of the kind mentioned in the opening paragraph are well known in the art. The known electrical lamp comprises a central current-supply conductor and a side current-supply conductor which issue from the lamp vessel. In addition, the electrical lamps are provided with a lamp base, also addressed to as the lamp foot. The lamp base normally comprises an externally threaded sheet-metal shell. The lamp base of electrical lamps generally provides mechanical and electrical connection of the central current-supply conductor and the side current-supply conductor.

15 Connecting the central current-supply conductor and the side current-supply conductor to the lamp base is normally done by soldering. Soldering is a well-known technology. Commonly employed solder materials are alloys of lead.

20 A disadvantage of the known electrical lamp is that the material used in the soldering process may have toxic aspects. Future regulations may describe that lead free soldering is mandatory.

The invention has for its object to eliminate the above disadvantage wholly or partly. According to the invention, an electrical lamp of the kind mentioned in the opening paragraph for this purpose comprises:

25 a lamp vessel closed in a gastight manner and provided with an illumination source,

a central current-supply conductor and a side current-supply conductor issuing from the lamp vessel,

a lamp base for providing mechanical connection of the lamp vessel and for providing mechanical and electrical connection of the central current-supply conductor and the side current-supply conductor,

- 5 the lamp base being provided at a side facing the lamp vessel with a notch for passing through the side current-supply conductor,

the side current-supply conductor being provided at a side facing away from the lamp base with a coagulated droplet of material of the side current-supply conductor.

- An advantage of the electrical lamp according to the invention is that the side current-supply conductor in the notch of the lamp base and the coagulated droplet of material 10 of the side current-supply conductor provide a reliable mechanical and electrical connection to the lamp base. In the electrical lamp according to the invention soldering is avoided.

To further enhance the mechanical and electrical contact between the side current-supply conductor and the lamp base, the coagulated droplet is, preferably, in contact with the lamp base.

- 15 Preferably, the coagulated droplet is made by laser heating a part of the side current-supply conductor issuing from the notch in the lamp base. The laser melts the side current-supply conductor, a droplet of molten material travels in the direction of the notch in the lamp base. When the droplet of molten material touches the lamp base at the location of the notch, the heat in the droplet is dissipated in the material of the lamp base. As a 20 consequence, the droplet solidifies at the location of the notch in the lamp base.

Preferably, the side current-supply conductor is made from monel wire. Monel wire is a well-known material used for current-supply conductors in electrical lamps. A suitable material for the lamp base is aluminum.

- A preferred embodiment of the electrical lamp according to the invention is 25 characterized in that the side current-supply conductor is in clamping engagement with the notch in the lamp base. The clamping engagement further enhances the mechanical and electrical contact between the side current-supply conductor and the lamp base.

- 30 Preferably, the notch in the lamp base is wedge-shaped. The mechanical and electrical contact between the side current-supply conductor and the lamp base is improved when a wedge-shape notch is employed.

Preferably, the notch is provided in the lamp base by means of laser cutting. The shape, in particular the wedge-shape of the notch in the lamp base can be provided relatively easily by means of laser cutting.

The invention will now be elucidated in more detail with reference to a number of embodiments and a drawing, in which:

5 Figure 1A shows a perspective view of an electrical lamp according to an embodiment of the invention, and

Figure 1B shows a perspective view of a detail of the lamp base of the electrical lamp according to an embodiment of the invention.

The Figures are purely diagrammatic and not drawn true to scale. Some dimensions are particularly strongly exaggerated for reasons of clarity. Equivalent 10 components have been given the same reference numerals as much as possible in the Figures.

Figure 1A schematically shows a partly perspective view of an electrical lamp according to an embodiment of the invention. Figure 1B schematically shows a partly 15 perspective view of a detail of the lamp base of the electrical lamp according to an embodiment of the invention. The electrical lamp comprises a lamp vessel 1 closed in a gastight manner and provided with an illumination source 2. In the example of Figure 1A, the illumination source 2 is a (tungsten) incandescent body. In an alternative embodiment, the illumination source is a halogen burner provided in the lamp vessel. In a further 20 embodiment, the illumination source can be a metal halide lamp provided in the glass vessel.

The illumination source 2 is provided with a central current-supply conductor 3 and a side current-supply conductor 4. The central current-supply conductor 3 and a side current-supply conductor 4 issue from the lamp vessel 1 (not shown in Figure 1A).

25 The electrical lamp in Figure 1A is provided with a lamp base 5, also addressed to as the lamp foot. The lamp base normally comprises an externally threaded sheet-metal shell having one end enclosed with a ring 15 of insulation (for example a glass). The ring 15 is provided with central aperture communicating with the interior of the shell. Normally the central current-supply conductor 3 is electrically connected to the central aperture in the ring 15.

30 The electrical lamp in Figure 1A is a typical Edison screw type lamp. The lamp base 5 generally provides mechanical connection of the lamp vessel 1. In addition, the lamp base 5 provides mechanical and electrical connection of the central current-supply conductor 3 and the side current-supply conductor 4 to the exterior.

According to the invention, the lamp base 5 is provided, at a side facing the lamp vessel 1, with a notch 6 for passing through the side current-supply conductor 3. In addition, the side current-supply conductor 4 is, at a side facing away from the lamp base 5, provided with a coagulated droplet 7 of material of the side current-supply conductor 4. The 5 notch 6 in the lamp base 5 carrying the side current-supply conductor 4 is shown in detail in Figure 1B. The side current-supply conductor 4 in the notch 6 of the lamp base 5 and the coagulated droplet 7 of material of the side current-supply conductor 4 provides a reliable mechanical and electrical connection to the lamp base. A reliable connection is realized while soldering is dispensed with. To further enhance the mechanical and electrical contact 10 between the side current-supply conductor 4 and the lamp base 5, the coagulated droplet 7 is, preferably making contact with the lamp base.

The coagulated droplet 7 is, preferably, made by laser heating. To this end a part of the side current-supply conductor 4 issuing from the notch 6 in the lamp base 5 is heated by a laser pulse. The laser melts the side current-supply conductor 4 creating a 15 droplet of molten material. The droplet of molten material travels in the direction of the notch in the lamp base. When the droplet of the molten material touches the lamp base 5 at the location of the notch 6, the heat in the droplet is dissipated in the material of the lamp base 5. As a consequence, the droplet solidifies at the location of the notch in the lamp base, thereby forming the coagulated droplet 7.

20 The side current-supply conductor 4 is, preferably, made from monel wire. Monel wire is a well-known material used for current-supply conductors in electrical lamps. Monel wire comprises 60-70% Ni, 25-35% Cu, 3% Mn, 1% Fe and 1% Si. A suitable lamp base material is aluminum.

25 Preferably, the side current-supply conductor 4 is in clamping engagement with the notch 6 in the lamp base 5. The clamping engagement further enhances the mechanical and electrical contact between the side current-supply conductor and the lamp base. The notch 6 in the lamp base 5 as shown in Figure 1B is wedge-shaped. The side current-supply conductor can be pulled into the notch, for example under the influence of a certain force, thereby enhancing the mechanical and electrical contact between the side 30 current-supply conductor and the lamp base.

The notch 6 is, preferably, provided in the lamp base 5 by means of laser cutting. The shape, in particular the wedge-shape of the notch 6 in the lamp base 5 can be provided relatively easily by means of laser cutting. In addition, the lamp base 5 in the vicinity of the rim generally also has a shape in the form of a spiral making conventional

cutting or sawing rather complicated. Because the material of the lamp base is relatively soft, it is, in addition, difficult to machine the lamp base without distorting the rim of the lamp base.

5 In the electrical lamp according to the invention a reliable connection of the side current-supply conductor to the lamp base is provided. Soldering the side current-supply conductor 4 to the lamp base 5 can be dispensed with.

It should be noted that the above-mentioned embodiments illustrate rather than limit the invention, and that those skilled in the art will be able to design many alternative embodiments without departing from the scope of the appended claims. In the claims, any 10 reference signs placed between parentheses shall not be construed as limiting the claim. Use of the verb "comprise" and its conjugations does not exclude the presence of elements or steps other than those stated in a claim. The article "a" or "an" preceding an element does not exclude the presence of a plurality of such elements. In the device claim enumerating several means, several of these means may be embodied by one and the same item of 15 hardware. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage.

## CLAIMS:

1. An electrical lamp comprising:
  - a lamp vessel (1) closed in a gastight manner and provided with an illumination source (2),
  - a central current-supply conductor (3) and a side current-supply conductor (4) issuing from the lamp vessel (1),
  - a lamp base (5) for providing mechanical connection of the lamp vessel (1) and for providing mechanical and electrical connection of the central current-supply conductor (3) and the side current-supply conductor (4),
  - the lamp base (5) being provided at a side facing the lamp vessel (1) with a notch (6) for passing through the side current-supply conductor (3),
  - the side current-supply conductor (4) being provided at a side facing away from the lamp base (5) with a coagulated droplet (7) of material of the side current-supply conductor (4).
- 10 2. An electrical lamp as claimed in claim 1, characterized in that the coagulated droplet (7) is in contact with the lamp base (5).
- 15 3. An electrical lamp as claimed in claim 1 or 2, characterized in that the coagulated droplet (7) is made by laser heating a part of the side current-supply conductor (4) issuing from the notch (6) in the lamp base (5).
- 20 4. An electrical lamp as claimed in claim 1 or 2, characterized in that the side current-supply conductor (4) is made from monel wire.
- 25 5. An electrical lamp as claimed in claim 1 or 2, characterized in that the lamp base (5) is made of aluminum.

6. An electrical lamp as claimed in claim 1 or 2, characterized in that the side current-supply conductor (4) is in clamping engagement with the notch (6) in the lamp base (5).
- 5 7. An electrical lamp as claimed in claim 1 or 2, characterized in that the notch (6) in the lamp base (5) is wedge-shaped.
8. An electrical lamp as claimed in claim 1 or 2, characterized in that the notch (6) is provided in the lamp base (5) by means of laser cutting.
- 10 9. A lamp base (5) for use in an electrical lamp as claimed in claim 1 or 2.

**ABSTRACT:**

An electrical lamp has a lamp vessel (1) and is provided with an illumination source (2). A central current-supply conductor (3) and a side current-supply conductor (4) issue from the lamp vessel. The electrical lamp has a lamp base (5) for providing mechanical connection of the lamp vessel and for providing mechanical and electrical connection of the current-supply conductors. At a side facing the lamp vessel, the lamp base is provided with a notch (6) for passing through the side current-supply conductor. At a side facing away from the lamp base, the side current-supply conductor is provided with a coagulated droplet of material of the side current-supply conductor. Preferably, the coagulated droplet is made by laser heating part of the side current-supply conductor issuing from the notch. According to 5 the invention, the side current-supply conductor is reliably connected to the lamp base while 10 soldering is dispensed with.

Fig. 1A

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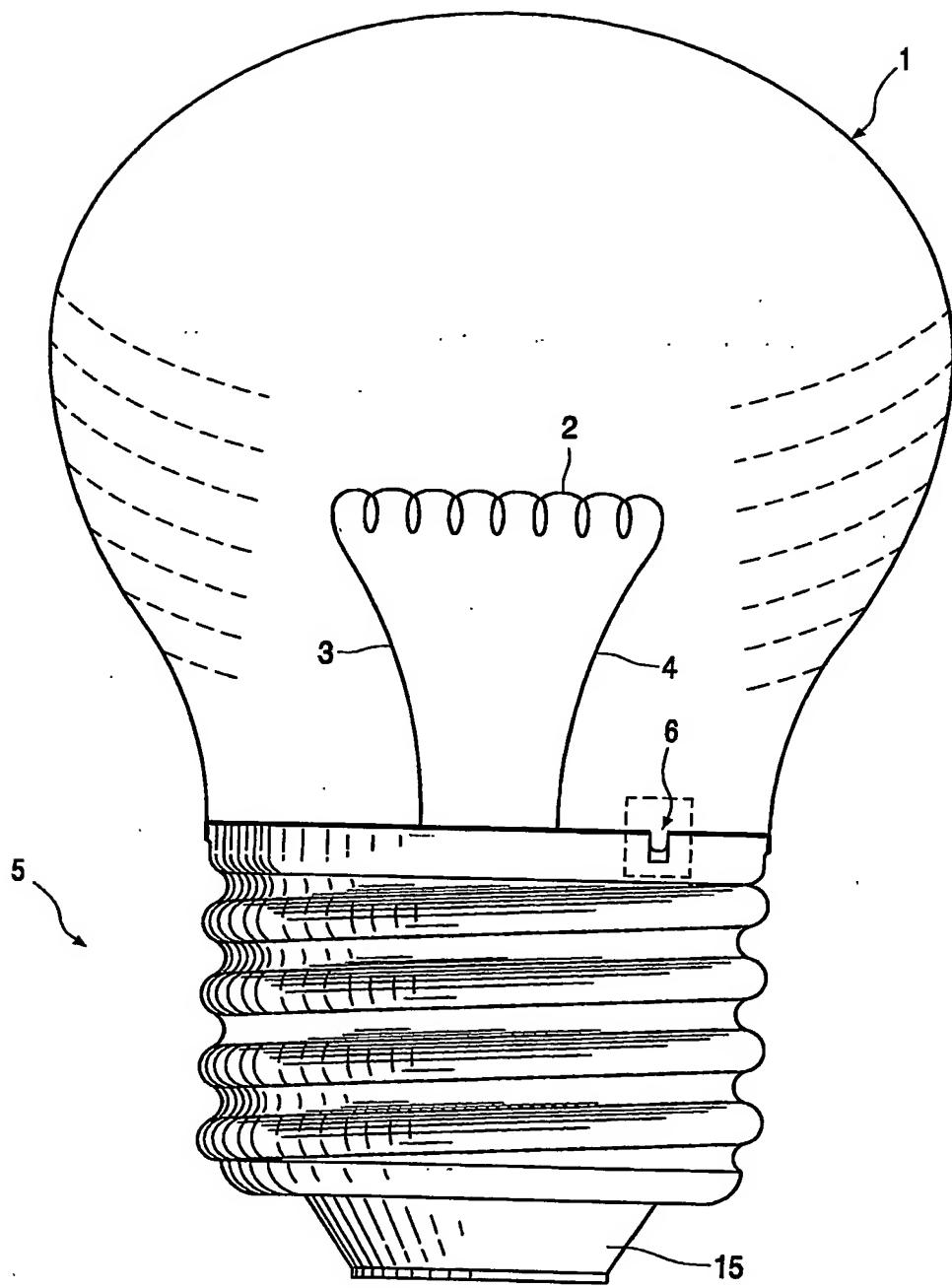


FIG. 1A

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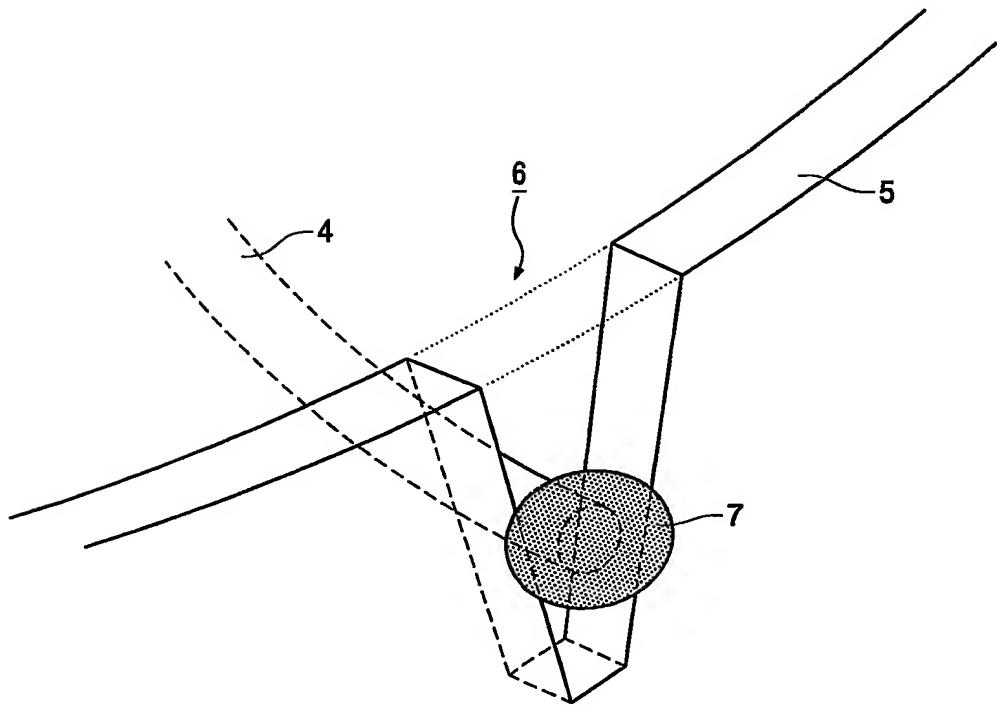


FIG. 1B

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